Adverse Outcomes of Pregnancy with Single Abnormal Value of 100-Gram Oral Glucose Tolerance Test in Phramongkutklao Hospital

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Objective: *To determine the adverse outcomes of pregnancy in women with single abnormal value of the 100g OGTT compared with women with normal value of 100g OGTT.*

Material and Method: *This retrospective study was conducted by reviewing medical records of all pregnant women screened for gestational diabetes mellitus (GDM) during antenatal visits from 1 January 2009 to 30 June 2015. The 100g OGTT results following either one-step or two-step approach were interpreted according to The Carpenter and Coustan's modification of O'Sullivan and Mahan's criteria. The participants were enrolled into case study and control groups with 1:2 ratio. All pregnant women with single abnormal value of the 100g OGTT were recruited into study group (n=395). Whereas, those with normal values for 100g OGTT (n=790) were randomly recruited into control group. Pregnancy outcomes were compared between the 2 groups.*

Results: *Women with single abnormal value 100g OGTT were older (31.82±4.92 vs. 30.79±5.58; p-value 0.001), had higher rate of family history of type 2 DM (36.5% vs. 30.8%; p-value 0.049) and lower mean gestational age at birth (38.07±1.55 vs. 38.32±1.38; p-value 0.005) than the control group. The adverse outcomes of pregnancy significantly occurred in the study group included higher rate of macrosomia (4.3% vs. 1.5%; p-value 0.003) and large for gestational age (LGA) (11.9% vs. 6.7%; p-value 0.002) when compared with the control group.*

Conclusion: *Women with single abnormal value of 100g OGTT, even not diagnosed with GDM, tend to experience adverse outcomes of pregnancy that obstetricians should be aware of.*

Keywords: *100g OGTT, single abnormal value 100-gram glucose tolerance test, gestational diabetes mellitus, adverse outcomes of pregnancy*

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Gestational diabetes mellitus (GDM) is a common medical complication during pregnancy. The prevalence was reported to be 6-7% in the United States of America[1] and 5.7-21.8% in Thailand[2]. The prevalence varies by ethnicity, race and age. Poorly controlled GDM can lead to adverse pregnancy outcomes for both the mother and the fetus, such as pregnancy induced hypertension, postpartum hemorrhage, preterm delivery, large for gestational age, shoulder dystocia, fetal birth asphyxia, neonatal hypoglycemia, congenital anomaly, etc.[3]. According to the Hyperglycemia and Adverse Pregnancy Outcome (HAPO) Study, The International Association of Diabetes and Pregnancy Study Groups 2010 (IADPSG 2010) and American Diabetes Association 2011 (ADA 2011), high blood sugar is associated with adverse pregnancy outcomes[3].

Diagnosis of GDM can be performed by screening all pregnant women (universal screening) or only pregnant women at risk (risk factor based screening), and the method of diagnosis may be carried out by one-step or two-step approach. The one-step approach uses a 100-gram oral glucose challenge test (100g OGTT), while the two-step approach begins with 50-gram glucose challenge test (50g GCT), and those who meet or exceed the screening threshold would undergo 100g OGTT. The American College of Obstetricians and Gynecologists (ACOG) 2013 recommended screening all pregnant women by two-step approach at 24-28 weeks of gestation, or as soon as possible in high-risk women, and if the result of the early testing is negative, it should be repeated at 24-28 weeks of gestation[1]. In Thailand, GDM screening is

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different among each institution. At Phramongkutklao Hospital, either one-step or two-step approach is performed based on the physician preference.

The 100g OGTT includes fasting blood sugar (FBS), followed by the other 3 blood sugar levels at one, two and three hours after 100-gram oral glucose administration. At least two abnormal values make a diagnosis of GDM. In contrast, the pregnant women with only single abnormal value of 100g OGTT are not diagnosed GDM and would be treated similarly to those with normal result. However, some studies have shown that pregnant women with single abnormal value of 100g OGTT are associated with increased adverse pregnancy outcomes, including cesarean section rates[4,5], pregnancy induced hypertension[4,6-8], small for gestational age[6], birth weight >4000g[4,7,9-11], birth weight >4500g[4], large for gestational age[5,12], neonatal admission to NICU[4,5], fetal birth asphyxia[6], neonatal hypoglycemia[6] and stillbirth[6].

In Thailand, there are no recommendations for the management of women with single abnormal value of 100g OGTT and only few studies on this topic. Management for pregnant women in this group is also controversial. Thus, the present study aims to examine the adverse outcomes of pregnancy in women with single abnormal value of 100g OGTT compared with women with normal values of 100g OGTT.

Material and Method

The retrospective study was conducted after an approval of the Institutional Review Board of the Royal Thai Army Medical Department., approval No. 1706/2558. Laboratory database and medical records of all pregnant women screened for GDM and delivered at Phramongkutglao Hospital from1 January 2009 to 30 June 2015 were reviewed.

Sample size was calculated base on a similar study by Lindsay MK, 1986 studied at University school of medicine in Georgia, which showed a significant difference in rate preeclampsia/eclampsia when compared women with single abnormal value of the 100g OGTT to women with normal value of 100g OGTT (7.9%, 3.3%)[7]. The sample size was estimate to be at least 385 in each group with $\alpha = 0.05$ and $\beta = 0.10$.

According to our hospital protocol, pregnant women without risk factors would be screened for GDM at 24-28 weeks of gestation. In those with certain risk factors (previous history of GDM, known impaired glucose metabolism, body mass index $\geq$30 kg/m^2), the test would be done as soon as possible and would be repeated at 24-28 weeks of gestation if GDM is not diagnosed initially. Either one-step approach or two-step approach may be offered. One-step approach utilizes 100g OGTT, whereas, two-step approach begins with 50g GCT and 100g OGTT would be performed if 50g GCT shows blood sugar level $\geq$140 mg/dl. Regarding Carpenter and Coustan's modification of O'Sullivan and Mahan's criteria, fasting blood sugar (FBS), plasma glucose at one, two and three hours after administration of 100g oral glucose are defined as abnormal when $\geq$95, $\geq$180, $\geq$155, $\geq$140 mg/dl, respectively[13,14]. GDM is diagnosed when at least two of four values are abnormal.

All pregnant women with single abnormal value of 100g OGTT were enrolled in the present study group. While the control group was selected by the systemic random sampling method from those with normal values of the 100g OGTT. With the ratio of 1:2, 395 cases and 790 cases were recruited in the study and control groups, consecutively.

Patients with pre-pregnancy diabetic mellitus (overt DM), multifetal pregnancy, incomplete data for the 100g OGTT result and incomplete data of adverse pregnancy outcomes were excluded from the present study.

Demographic data, including BMI, family history of type 2 diabetes, previous history of GDM, and known impaired glucose metabolism, were recorded. Pregnancy outcomes during antepartum, intrapartum, postpartum, as well as neonatal outcomes were recorded. Adverse maternal outcomes, including preterm delivery, polyhydramnios, oligohydramnios, pregnancy-induced hypertension[15], pyelonephritis, chorioamnionitis, mode of delivery, postpartum hemorrhage were verified. Adverse neonatal outcomes[16] which were noted comprising intrauterine growth restriction (IUGR) (estimated fetal weight <10th percentile for gestational age), fetal death, macrosomia (birth weight >4,000 grams), low birth weight (birth weight <2,500 grams), large for gestational age (LGA) (birth weight >90th percentile for gestational age at birth), small for gestational age (SGA) (birth weight <10th percentile for gestational age at birth), birth asphyxia, shoulder dystocia, neonatal hypoglycemia, hyperbilirubinemia, respiratory distress syndrome (RDS), neonatal admission to NICU, and congenital anomaly.

Statistical analysis was performed using the SPSS statistical software (version 17) Chi-square test or Fisher's exact test was used for comparing the

adverse outcomes of pregnancy between the two groups and determining via the subgroup analysis which of the elevated values of 100g OGTT was related to the adverse outcomes of pregnancy. Student's t-test was used to compare continuous data. Univariate logistic regression analysis was used to determine Crude OR of the relationship between adverse outcomes of pregnancy in two groups, and multivariate logistic regression was used to determine adjust odds ratio for adverse outcomes of pregnancy between two groups after adjusting for maternal age, gestational age at birth (weeks), multiparous status, strong family history of type 2 DM. Statistical significance was reported at *p*-value <0.05.

Results

During the study period, 8,742 women underwent GDM screening, 580 women were diagnosed with GDM and 21 women were diagnosed multiple pregnancy, they were excluded from the study. Of the remaining 8,141, four-hundred and forty-four women had single abnormal value of 100g OGTT. Of these, 49 women had incomplete data of the adverse pregnancy outcomes, so 395 women were composed in the study group. Among 7,697 women with normal results, 326 women had incomplete data of the adverse pregnancy outcomes. So out of 7,371 women with normal result, 790 were chosen by randomly selecting every ninth patient to be the control group.

The maternal demographic characteristics were shown in Table 1. Women with single abnormal value of 100g OGTT were significantly older (31.82 ±4.92 vs. 30.79±5.58; *p*-value 0.001), multiparous (63.3% vs. 54.8%; *p*-value 0.005), had a higher rate of family history of type 2 DM (36.5% vs. 30.8%; *p*-value 0.049), higher mean gestational age at the time of the 100g OGTT test (29.32±5.46 weeks vs. 28.15±6.12 weeks) and lower mean gestational age at birth (38.07 ±1.55 vs. 38.32±1.38; *p*-value 0.005) than the control group. When potential confounding factors were controlled by multivariate logistic regression analysis, all characteristics remained statistically significant different except for multiparous as shown in Table 2. Women with single abnormal value of 100g OGTT were not statistically significant difference from the control group in terms of maternal outcomes as summarized in Table 3.

Table 4 illustrated neonatal outcomes. Women with single abnormal value of 100g OGTT had significant greater mean birth weight of infant (3,143g vs. 3,086g; *p*-value 0.043) and higher rate of macrosomic infants (birth weight >4,000g) than the control group (4.3% vs. 1.5%; *p*-value 0.003). The study group had a significant higher rate of LGA than the control group (11.9% vs. 6.7%; *p*-value 0.002), and the abnormal glucose value remained a considerable risk for LGA after multivariate logistic regression analysis (adjusted 1.714; 95% CI 1.114-2.637). The study group had significant higher neonatal hypoglycemia (6.1% vs. 2.9%; *p*-value 0.009) and hyperbilirubinemia (32.9% vs. 27.31%; *p*-value 0.047) than the control group, but no significant difference between the two groups was identified subsequent to multivariate logistic regression analysis, as shown in Table 2.

The subgroup analysis to determine which of the four elevated test values among the study group was related to the adverse outcomes of pregnancy was shown in Table 5. Elevated FBS was significantly associated with LGA and macrosomia (29.4%; *p*-value 0.023 and 17.6%; *p*-value 0.007), while abnormal test at 1 hour, 2 hours, and 3 hours after glucose loading had no considerable risk of adverse pregnancy outcomes.

Discussion

Our data suggest that although women with single abnormal value of 100g OGTT do not meet diagnostic criteria for GDM, but they are still at risk of adverse pregnancy outcomes associated with GDM.

The present study confirms previous reports[4,7,9-11,17-23] that incidence of large infants (fetal macrosomia and LGA infants) is increased among pregnant women with single abnormal value of 100g OGTT.

The incidence of fetal macrosomia and LGA infants in the present study group were 4.3% and 11.9%, respectively. In contrast, previous studies reported higher incidence of LGA ranging from 17 - 24.9%[5,12,18,23,24], and higher proportion of fetal macrosomia ranging from 16 - 28.7%[4,7,11,17,18,22] among pregnant women with one abnormal 100g OGTT value. The difference could be due to multiple factors such as race, pre-pregnant BMI, maternal age, multiparity, education status, diet control and history of prior macrosomia infants[10,12,25]. Nevertheless the incidence of LGA infants in the present study was still higher than that in the normal population, where the incidence is 1-11.6%[10]. These results indicated that only a slight abnormal glucose metabolism value may result in the accelerated growth of infants. After controlling potential confounding factors (maternal age, parity, gestational age at birth and strong family history of

Table 1. Maternal demographic characteristics

Characteristics	100g OGTT				*p*-value
	Normal (n = 790)		Single abnormal (n = 395)		
	n	%	n	%	
Age (years)					0.859
<35	548	69.4	272	68.9	
≥35	242	30.6	123	31.1	
Means±S.D.	30.79±5.58		31.82±4.92		0.001*[T]
Pre-pregnant BMI (kg/m²)					0.864
<18.5	78	9.9	35	8.9	
18.5-24.9	532	67.3	261	66	
25.0-29.9	146	18.5	83	21	
30.0-34.9	27	3.4	13	3.3	
≥35	7	0.9	3	0.8	
Means±S.D.	22.43±3.68		22.73±3.54		0.182[T]
Total weight gain (kg) Means±S.D.	15.21±5.65		15.04±5.32		0.638[T]
Parity					0.005*
Nulliparous	357	45.2	145	36.7	
Multiparous	433	54.8	250	63.3	
Gestational age at birth(weeks) Means±S.D.	38.32±1.38		38.07±1.55		0.005*[T]
Underlying disease	255	32.3	141	35.7	0.240
Hypertension	11	1.4	9	2.3	0.264
Asthma	8	1.0	7	1.8	0.270
Thyroid disease	22	2.8	13	3.3	0.627
Thalassemia	203	25.7	93	23.5	0.420
Others	16	2.0	18	4.6	-
High risk for gestational diabetes mellitus (GDM)					
Obesity (BMI ≥30 kg/m²)	34	4.3	16	4.1	0.838
Strong family history of type 2 DM	243	30.8	144	36.5	0.049*
Gestational age at OGTT Means±S.D.	28.15±6.12		29.32±5.46		0.001*[T]

Chi-Square test, T= Independent student's t-test
* Significant at the 0.05 level

Table 2. Multivariate logistic regression estimates of relative risk for adverse outcomes of pregnancy in women with single abnormal value of 100-gram OGTT versus control groups (n=1,185)

	Crude OR	Adjusted				*p*-value
		95%CI	*p*-value	OR	95%CI	
Age (years)	1.037	1.013-1.061	0.002*	1.034	1.010-1.060	0.007*
Gestational age at birth (weeks)	0.888	8.17-0.965	0.005*	0.914	0.837-0.998	0.046*
Multiparous	1.422	1.109-1.822	0.005*	1.216	0.934-1.583	0.146
Strong family history of type 2 DM	1.291	1.001-1.666	0.049*	1.346	1.037-1.746	0.025*
Large for gestational age (LGA)	1.878	1.243-2.838	0.003*	1.714	1.114-2.637	0.014*
Neonatal hypoglycemia	2.157	1.202-3.873	0.010*	1.795	0.966-3.334	0.064
Hyperbilirubinemia	1.304	1.003-1.694	0.047*	1.160	0.881-1.528	0.291

* Significant at the 0.05 level

Table 3. Maternal outcomes

Maternal outcomes	100g OGTT				*p*-value
	Normal (n = 790)		Single abnormal (n = 395)		
	n	%	n	%	
Mode of delivery					
Spontaneous vertex delivery	452	57.2	211	53.4	0.214
Forceps extraction	9	1.1	2	0.5	0.354
Vacuum extraction	2	0.3	0	0	0.555
Cesarean section	327	41.4	182	46.1	0.125
Preterm delivery (GA<37weeks)	62	7.8	41	10.4	0.145
Hypertension in pregnancy					
Chronic hypertension with superimposed preeclampsia	7	0.9	2	0.5	0.726[F]
Gestational hypertension	32	4.1	14	3.5	0.671
Preeclampsia-eclampsia	20	2.5	18	4.6	0.062
Chronic hypertension	6	0.8	5	1.3	0.521
Polyhydramnios	5	0.6	1	0.3	0.670[F]
Oligohydramnios	22	2.8	9	2.3	0.607
Pyelonephritis	2	0.3	0	0	0.555[F]
Chorioamnionitis	8	1.0	1	0.3	0.156
Postpartum hemorrhage	16	2.0	13	3.3	0.184

Chi-Square test, F = Fisher's Exact

Table 4. Neonatal outcomes

Neonatal outcomes	100g OGTT				*p*-value
	Normal (n = 790)		Single abnormal (n = 395)		
	n	%	n	%	
Intrauterine growth restriction (IUGR)	14	1.8	10	2.5	0.382
Fetal death	0	0	1	0.3	0.333[F]
Birth weight (grams)					
Mean±S.D.	3,086.05±436.44		3,143.80±511.34		0.043*[T]
Min-Max	1500-4410		920-4810		
Macrosomia (birth weight >4,000 g)	12	1.5	17	4.3	0.003*
Low birth weight (<2,500 g)	65	8.2	35	8.9	0.712
Large for gestational age (LGA)	53	6.7	47	11.9	0.002*
Small for gestational age (SGA)	10	1.3	7	1.8	0.490
Apgar score at 1 min <7	22	2.8	12	3.0	0.806
Apgar score at 5 min <7	3	0.4	2	0.5	1.000[F]
Shoulder dystocia	2	0.3	1	0.3	1.000[F]
Neonatal hypoglycemia	23	2.9	24	6.1	0.009*
Hyperbilirubinemia	216	27.3	130	32.9	0.047*
Respiratory distress syndrome	9	1.1	2	0.5	0.354[F]
Neonatal admission to NICU	11	1.4	9	2.3	0.264
Congenital anomaly					
Cardiovascular system	1	0.1	1	0.3	1.000[F]
Craniofacial	3	0.4	0	0	0.555[F]
Musculoskeletal system	3	0.4	3	0.8	0.407[F]
Chromosome abnormality	3	0.4	0	0	0.555[F]

Chi-Square test, F = Fisher's exact, T= Independent student's t-test
* Significant at the 0.05 level

Table 5. Subgroup analysis for adverse outcomes of pregnancy in women with single abnormal value of 100g OGTT

Adverse outcomes of pregnancy	Single abnormal value 100g OGTT							
	FBS abnormal (n = 17)	*p*-value	1 hour abnormal (n = 183)	*p*-value	2 hour normal (n = 145)	*p*-value	3 hour abnormal (n = 50)	*p*-value
Large for gestational age (LGA)	29.4%	0.023*	11.5%	0.809	9.0%	0.170	16.0%	0.338
Macrosomia	17.6%	0.007*[F]	2.7%	0.794[F]	4.1%	0.155[F]	6.0%	0.120[F]
Neonatal hypoglycemia	5.9%	0.973	5.5%	0.636	5.5%	0.723	10.0%	0.214
Hyperbilirubinemia	35.3%	0.831	28.4%	0.077	37.2%	0.163	36.0%	0.619

Chi-Square test, F = Fisher's exact
* Significant at the 0.05 level

type2 DM), single abnormal value of 100g OGTT was still an independent risk of LGA.

Our findings from the subgroup analysis showed that only an elevated FBS value (≥95-<126 mg/dl) in women with a single abnormal value for the 100g OGTT was a significant predictor of LGA and macrosomia infants, which was consistent with a previous study[21]. On contrary, a single abnormal value at 1 hour, 2 hours or 3 hours was not associated with adverse pregnancy outcomes. Other studies have shown that a single abnormal one hour value of the 100g OGTT significantly resulted in poor maternal and perinatal outcomes[6], while a single abnormal two-hour value of the 100g OGTT significantly predicted an increase in shoulder dystocia[20], preeclampsia[21] and LGA infants[22]. This suggests that large infant is to some extent attributable to abnormal glucose value. Thus, fetal surveillance for these patients should be warranted.

Langer et al[18] reported that neonatal hypoglycemia and hyperbilirubinemia increased in women with a single abnormal value of the 100g OGTT which was in line with our study. But it was not statistically significant after adjusting for confounding factors with a multivariate logistic regression analysis.

Regarding maternal characteristics, women with single abnormal value of 100g OGTT in the present study were older and had higher rate of family history of type 2 DM when compared with those with normal results, which were similar to other studies[4,5,7,12]. The women in this group had shorter mean gestational age at birth than the control group but no clinical significant, our result was inconsistent with the study by Lindsay et al[7] which found that the most significant risk factor of fetal macrosomia was a gestational age of more than 42 weeks. Other studies have found that patients with diabetes tend to have longer gestations. The reason for this is unknown. However, maternal hyperglycemia is known to delay lung and placenta maturity. In the present study, no patient was allowed to carry on a pregnancy beyond 42 weeks gestation, and the mean gestational age at birth was 38.07±1.55 weeks: the optimal time for the delivery of most diabetic pregnancies is between 38.5 and 40 weeks[16].

Our study failed to support the relationship between single abnormal value of 100g OGTT and adverse maternal outcomes as showed in previous studies including an increased rate of cesarean sections[4-5] and preeclampsia[4,6-8]. However, higher rates of cesarean sections and preeclampsia/eclampsia were found among women in the study group than in the control group (46.1% vs. 41.4%, 4.6% vs. 2.5%, respectively) but not statistically significant (*p*-value >0.05).

Our study was a large study in Thailand that found regarding adverse outcomes in the pregnancies of women with a single abnormal value for the 100g OGTT, which confirms the outcomes of previous studies in other countries, such as Taiwan, South Korea, the United States of America, Canada, Sweden, Italy, Denmark and France. This result can be applied to prepare Clinical Practice Guidelines (CPG) for the management of pregnant women with a single abnormal value from the 100g OGTT. For more information, a prospective randomized controlled trial of acute GDM management versus expectant management in women with a single abnormal value of the 100g OGTT should be performed.

There were some limitations of the present study. Since the study design was a retrospective one, the results might be affected by the accuracy of the information collected. Furthermore, it would require large samples to evaluate the possibility of a relation between the single abnormal OGTT and frequency of some rare outcomes such as shoulder dystocia which

could not be demonstrated from the present study.

Our result indicates that pregnant women with a single abnormal value for the 100g OGTT are likely to experience adverse outcomes of pregnancy, especially an increased risk factor of large infants. Obstetricians should approach women with several GDM risk factors and a single abnormal value for the 100g OGTT with caution, and thus surveillance, dietary counselling, intervention and glucose monitoring for these particular patients should be performed.

What is already known on this topic?

Patients with a single abnormal 100g OGTT value are at increased rate of cesarean section, preeclampsia, fetal macrosomia and neonatal morbidity, but few studies had been done in Thailand.

What this study add?

Our result confirms an increased risk of large infants (fetal macrosomia and LGA infants) in pregnant women with a single abnormal value for the 100g OGTT, especially a single abnormal FBS value for the 100g OGTT has a strong relation to the risk of large infants.

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Potential conflicts of interest

None.

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ผลการตั้งครรภ์อันไม่พึงประสงค์ในหญิงที่ตรวจพบค่าน้ำตาลผิดปกติหนึ่งค่าจากการตรวจวินิจฉัยด้วยวิธีทดสอบความทนต่อน้ำตาล 100 กรัมในโรงพยาบาลพระมงกุฎเกล้า

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วัตถุประสงค์: *เพื่อศึกษาผลการตั้งครรภ์อันไม่พึงประสงค์ในหญิงที่ตรวจพบค่าน้ำตาลผิดปกติหนึ่งค่า จากการตรวจวินิจฉัยด้วยวิธีทดสอบความทนต่อน้ำตาล 100 กรัม ในโรงพยาบาลพระมงกุฎเกล้า*

วัสดุและวิธีการ: *ทำการศึกษาย้อนหลังจากเวชระเบียนของหญิงตั้งครรภ์ที่มาฝากครรภ์และคลอดที่โรงพยาบาลพระมงกุฎเกล้า ในช่วงวันที่ 1 มกราคม พ.ศ. 2552 ถึงวันที่ 30 มิถุนายน พ.ศ. 2558 ซึ่งจะคัดเลือกหญิงตั้งครรภ์เดี่ยวทุกรายที่มีบันทึกข้อมูลว่าได้รับตรวจคัดกรองเบาหวานขณะตั้งครรภ์ด้วยวิธีทดสอบความทนต่อน้ำตาล 100 กรัม (100g OGTT) ทั้งแบบ 1 ขั้นตอน หรือแบบ 2 ขั้นตอน โดยใช้เกณฑ์การวินิจฉัยค่าผิดปกติของวิธีทดสอบความทนต่อน้ำตาล 100 กรัม ของ Carpenter and Coustan's modification of O'Sullivan and Mahan's criteria จากนั้นจะแบ่งกลุ่มประชากรเป็น 2 กลุ่ม คือ กลุ่มศึกษา และกลุ่มเปรียบเทียบ ด้วยอัตรา 1 ต่อ 2 โดยกลุ่มศึกษา คือ หญิงตั้งครรภ์ทุกคนที่มีผลการทดสอบความทนต่อน้ำตาล 100 กรัม ผิดปกติ 1 ค่าจาก 4 ค่า จำนวน 395 คน และกลุ่มเปรียบเทียบ คือ หญิงตั้งครรภ์ที่มีผลการทดสอบความทนต่อน้ำตาล 100 กรัม ปกติ คัดเลือกโดยวิธีการสุ่ม จำนวน 790 คน จากนั้นเปรียบเทียบผลของการตั้งครรภ์ระหว่าง 2 กลุ่ม*

ผลการศึกษา: *หญิงที่ตรวจพบค่าน้ำตาลผิดปกติหนึ่งค่าจากการตรวจวินิจฉัยด้วยวิธีทดสอบความทนต่อน้ำตาล 100 กรัม จะมีอายุมากกว่า (31.82±4.92 vs. 30.79±5.58; p-value 0.001) มีประวัติญาติสายตรงเป็นโรคเบาหวานชนิดที่ 2 มากกว่า (36.5% vs. 30.8%; p-value 0.049) และคลอดที่อายุครรภ์น้อยกว่า (38.07±1.55 vs. 38.32±1.38; p-value 0.005) กลุ่มที่ตรวจพบค่าน้ำตาลปกติทั้ง 4 ค่า สำหรับผลการตั้งครรภ์อันไม่พึงประสงค์ในหญิงที่ตรวจพบค่าน้ำตาลผิดปกติหนึ่งค่านั้น พบทารกน้ำหนักแรกคลอดมากกว่า 4,000 กรัมมากกว่า (4.3% vs.1.5%; p-value 0.003) และทารกตัวโตกว่าอายุครรภ์มากกว่า (11.9% vs. 6.7%; p-value 0.002) เมื่อเปรียบเทียบกับกลุ่มที่ตรวจพบค่าน้ำตาลปกติทั้ง 4 ค่า*

สรุป: *แม้ว่าหญิงตั้งครรภ์ที่ตรวจพบค่าน้ำตาลผิดปกติเพียงหนึ่งค่าจากการทดสอบความทนต่อน้ำตาล 100 กรัม จะไม่ได้รับการวินิจฉัยเป็นเบาหวานขณะตั้งครรภ์ แต่จากการศึกษานี้พบว่ามีแนวโน้มของการเกิดผลการตั้งครรภ์อันไม่พึงประสงค์เพิ่มขึ้น ดังนั้นสูติแพทย์จึงควรมีความตระหนักในการดูแลมากขึ้น*